

REMARKS

This application has been reviewed in light of the Office Action dated May 20, 2005. Claims 1-5, 8-10, and 16-80 are presented for examination, and have been amended to define more clearly what Applicant regards as his invention; no change in scope of these claims is either intended or believed to be effected by these changes. Claims 6, 7, and 11-15 have been canceled, without prejudice or disclaimer of subject matter. Claims 1, 8, 16, 43, and 70 are in independent form. Favorable reconsideration is requested.

Applicants note with appreciation the indication that Claims 36-42 and 63-69 would be allowable if rewritten so as not to depend from a rejected claim, and with no change in scope. The latter claims have not been so rewritten because, for the reasons given below, their base claim is believed to be allowable.

Claim 1 was rejected under 35 U.S.C. § 112, second paragraph, for lack of antecedent basis. In particular, the Examiner states that the recitation that the second image is encoded according to the predetermined format has insufficient antecedent basis.

The claims have been carefully reviewed and amended as deemed necessary to ensure that they conform fully to the requirements of Section 112, second paragraph, with special attention to the points raised in paragraph 1 of the Office Action. In particular, Claim 1 has been amended to recite that the second image is encoded according to the predetermined encoding scheme. It is believed that the rejection of Claim 1 under Section 112, second paragraph, has been obviated, and its withdrawal is therefore respectfully requested.

Claims 21 and 48 were objected to at paragraph 2 of the Office Action. The Examiner states that “flat color” as recited in the claims is allegedly not defined in the specification. Claims 21 and 48 have been amended to recite “plane fill color”.

Accordingly, withdrawal of the objection of Claims 21 and 48 is respectfully requested.

Claims 1-5, 8-10, 16-25, 27-35, 43-52, 54-62, 70-75, and 77-80 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent 6,075,875 (Gu).

Claims 26, 53, and 76 were rejected under 35 U.S.C. § 103(a) as being obvious from Gu in view of U.S. Patent 6,636,216 (Silverbrook et al.).

Claim 1 is directed to a method of encoding a sequence of images for transmission over a communication network. The method includes the steps of (i) rendering a first image from an object-based computer graphics application, (ii) encoding the first image according to a predetermined encoding scheme, (iii) rendering a second image from the object-based computer graphics application, (iv) identifying changes between the first image and the second image from a change indicating output of the computer graphics application, (v) using the identified changes to determine a manner in which the second image is encoded according to the predetermined encoding scheme, and (vi) repeating steps (iii) to (v) for each subsequent image of the sequence.

Gu, as understood by Applicant, relates to a system for encoding video images which apparently seeks to improve upon block-based encoding traditionally used with MPEG-style encoders. Gu utilizes object-based video compression to improve the accuracy and versatility of encoding interframe motion and intraframe image features. Video information is compressed relative to objects of arbitrary configurations, rather than

fixed, regular arrays of pixels as in conventional video compression methods. (See column 3, lines 2-7 of Gu.) Further, Gu operates to identify image features of arbitrary configuration in a first video image frame and define within the image feature multiple distinct feature points (see column 3, lines 13-16 of Gu). Further, Gu uses a multi-dimensional transformation method to represent mappings between corresponding objects in successive image frames (see column 3, lines 27-30 of Gu). Also, the objects may be of arbitrary configuration and preferably represent distinct image features in a display image (see column 3, lines 51-53 of Gu). In the paragraph spanning columns 8 and 9, Gu discusses the disadvantages of conventional video compression techniques based upon the MPEG model, and, at column 9, lines 6-36, discusses how object-based video compression is used in Gu. Specifically, at column 9, lines 30-31, Gu states that the “object masks indicate the size, configuration, and position of an object on a pixel-by-pixel basis”.

From the above discussion of Gu, it is apparent that Gu is directed towards the compression of traditional video images which are formed as bit maps of pixels, for example captured by a video camera or the like. In these images or frames, each pixel is independent and it is the purpose of compression to identify similarities between adjacent pixels or groups of pixels in order to achieve the desired reduction in data size. As Gu discusses, MPEG style encoding makes use of fixed square arrays of pixels. Gu, however, relates to a system whereby various portions of the bit-map pixel-based image are segmented into arbitrary objects and each object is then treated distinctly for video compression purposes. In this fashion, the encoding process of Gu departs from the

encoding process of MPEG (for example) through seeking to clearly delineate major objects within each pixel based bit map image frame.

As a consequence of this discussion, it is therefore apparent that there is a significant patentable distinction between Gu and the present invention.

In Gu, each image frame exists in a pixel-based form and is then segmented into objects which are then utilized in the encoding process. The encoding (compression) of Gu operates upon objects.

In contrast, the method of Claim 1 includes rendering images from an object-based computer graphics application. As the Examiner will appreciate, an object-based computer graphics application operates to render mathematical expressions of images into a pixel-based displayable form and such computer graphic applications are typically used to render images upon computer screens or other displays for example for the generation of computer animation and the like. Notably, an image generated via an object-based computer graphics application, while ultimately being displayed in a pixel-based form, is fundamentally generated from a display list incorporating graphical objects which mathematically describe individual features of the image to be rendered.

In the method of Claim 1, each frame of the image is rendered from the computer graphics application to a pixel-based form. Then, the individual pixel-based form frames are encoded using an encoding method such as MPEG. In the method of Claim 1, the manner in which successive frames of the image sequence are encoded depends upon a change indicating output of the computer graphics application which is able to identify that part of the graphical based image that changes and which can therefore

influence the encoding scheme as it applies to that particular frame. Notably, while there is a working interrelationship therebetween, the computer graphics application and the encoder (compressor) are separate entities/functions.

In contrast, in the arrangement of Gu, each image frame exists in a pixel-based form and is then segmented to define major image objects and the motion of objects within the image are then tracked across adjacent frames with that motion forming part of the encoding. In Gu, there is no computer graphics application that renders an object based description of an image.

In the paragraphs spanning pages 2 and 3 of the Office Action, the Office Action does not point to which portion of Gu discloses a computer graphics application that renders a pixel-based image. All that is mentioned in that portion of the Office Action is a reference to Fig. 3A which illustrates the encoder process of Gu. Moreover, in rejecting Claims 1 and 43, at paragraph 4 of the Office Action, the Office Action apparently interprets the encoder 64 of Gu to be both the object based computer graphics application that performs the rendering of Claim 1, and also the encoder which encodes the rendered image. In the method of Claim 1, the computer graphics application and the encoder are entirely separate features, as can be seen, for example, in Fig. 2 of the present application.^{1/}

Furthermore, Claim 1 recites “a change indicating output” of the object-based computer graphics application as providing an input to the encoder. This can

^{1/}It is of course to be understood that the references to various portions of the present application are by way of illustration and example only, and that the claims are not limited by the details shown in the portions referred to.

be seen, for example, in Fig. 2 of the present application with respect to the buffer changes 244 and tree changes 246, both of which input to the encoder 226.

In contrast, Fig. 3A of Gu, which illustrates the encoder 64, is not seen to teach or suggest any computer graphics application which renders a graphical object-based image into a pixel-based form. Further, Applicants have found nothing in Gu that would teach or suggest the rendering of graphical object images into a pixel-based form prior to an attempt to encode those images for subsequent communication.

Nothing in Gu would teach or suggest (i) rendering a first image from an object-based computer graphics application, (ii) encoding the first image according to a predetermined encoding scheme, (iii) rendering a second image from the object-based computer graphics application, (iv) identifying changes between the first image and the second image from a change indicating output of the computer graphics application, and (v) using the identified changes to determine a manner in which the second image is encoded according to the predetermined encoding scheme, as recited in Claim 1.

Accordingly, Claim 1 is believed to be patentable over Gu.

Independent Claims 8, 16, 43, and 70 each recite certain features which are similar in many relevant respects to those discussed above with respect to Claim 1 and therefore are also believed to be patentable over Gu for the reasons discussed above.

The other claims in this application are each dependent from one or another of the independent claims discussed above and are therefore believed patentable for the same reasons. Since each dependent claim is also deemed to define an additional aspect of



the invention, however, the individual reconsideration of the patentability of each on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicant respectfully requests favorable reconsideration and early passage to issue of the present application.

Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

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